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Determination of nursing practices regarding port catheter care

Port kateter bakımına ilişkin hemşirelik uygulamalarının belirlenmesi

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ABSTRACT

Aim: The objective of this study is to determine the applications of nurses for port catheter care.

Material and Method: The research was conducted as a descriptive study. The study sample consisted of 196 nurses who worked in an Education and Research Hospital and agreed to participate in the study. In this study, data were collected using a data collection form created by researchers. Statistical data were expressed as mean±standard deviation (X±SS) and percentage (%).

Results: According to the results of this study, 90.8% of nurses were women, 65.8% were married, 69.4% had a bachelor's degree, and the average age was 38.08±8.76. 77.04% of nurses (n=151) are concerned about using a port catheter as a venous access point in a patient with a port catheter. 15.81% of the nurses (n=31) stated that they use port catheter right after controlling its location through radiography, 17.34% of the nurses (n=34) stated that pulling back blood on the syringe to confirm the location of the port catheter by observing the fluid flow, 20.4% of the nurses (n=40) state that they used a specific catheter needle to intervene the port catheter, 39.28% of the nurses (n=77) stated that they flushed the port catheter with saline and heparin saline to avoid clogging of the catheter. They flushed the catheter port once in 1-2 months with heparin saline when the catheter port cannot be used for a long time. 21.93% (n=43) of nurses stated that they dressed the area with antiseptic solution before application to prevent port catheter infection, and 17.34% (n=34) of them stated that they checked the location of the catheter by withdrawing blood before application to prevent extravasation.

Conclusion: The applications used by the nurses for port catheter care are compatible with the literature; however, these are limited.

Keywords: Port catheter, nursing, care

ÖZ

Amaç: Bu çalışmanın amacı hemşirelerin port kateter bakımına ilişkin uygulamalarını belirlemektir.

Gereç ve Yöntem: Araştırma tanımlayıcı bir çalışma olarak yürütülmüştür. Araştırmanın örneklemini bir eğitim ve araştırma hastanesinde çalışan ve araştırmaya katılmayı kabul eden 196 hemşire oluşturmuştur. Çalışmanın verileri araştırmacılar tarafından oluşturulmuş veri toplama formu ile toplanmıştır. Çalışma kapsamında toplanılan verilerin analizinde, Statistical Package for Social Sciences (SPSS) 21.0 bilgisayar paket programı kullanılmıştır. İstatistiksel veriler ortalama±standart sapma (X±SS) ve yüzde (%) olarak ifade edilmiştir.

Bulgular: Bu çalışmanın sonuçlarına göre, hemşirelerin %90.8'i kadın, %65.8'i evli, %69.4'ü lisans mezunu, yaş ortalaması ise 38.08±8.76'dır. Hemşirelerin %77.04'ü (n=151) port kateteri olan hastada venöz ulaşım yolu olarak port kateteri kullanmak konusunda endişe yaşamaktadırlar. Hemşirelerin %15.81'i (n=31) port kateteri radyografi ile yerinin kontrolünden hemen sonra kullandıklarını, hemşirelerin %25.51'i (n=50) port kateter alanında hematom gelişimini önlemek için soğuk uygulama yaptıklarını, %17.34'ü (n=34) port kateterin yerini doğrulamak için enjektörü yerleştirdikten sonra kanı geri çekerek mayinin gidişini kontrol ettklerini, %20.4'ü (n=40) port kateterden girişim yapmak için özel port kateter iğnesini kullandıklarını, %39.28'i (n=77) port kateterin tıkanmaması için serum fizyolojik ve heparinli serum fizyolojik ile yıkama yaptıklarını, port kateter uzun süre kullanılmayacağı durumlarda ise 1-2 ayda bir heparinli serum fizyolojikle yıkama yaptıklarını ifade etmiştir. Port kateter enfeksiyonunu önlemek için hemşirelerin %21,93'ü (n=43) uygulama öncesinde antiseptik solüsyonla pansuman yaptıklarını, %17.34'ü (n=34) ekstravazasyonu önlemek için uygulama yapmadan önce kanı geri çekerek kateterin yerini kontrol ettiklerini ifade etmiştir.

Sonuç: Port kateter bakımına ilişkin hemşirelerin yaptıkları uygulamalar literatürle uyumlu ancak sınırlıdır.

Anahtar Kelimeler: Port kateter, hemşirelik, bakım

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INTRODUCTION

Central venous catheters are commonly used to treat patients and are examined in three groups: external central venous catheters, peripherally placed central venous catheters, and subcutaneous central venous port catheters (1-3). The use of central venous catheters provides convenience in many procedures required by the treatment process, such as chemotherapy application, bone marrow transplantation, parenteral nutrition, monitoring of the patient in the perioperative process, administration of intravenous fluid and drugs, and taking blood samples and transfusion of blood products (1,4,5).

Port catheters are more preferred in cancer patients than other central venous catheters because of the long periods required to treat patients diagnosed with cancer, and their treatment can continue at home depending on the patient's health status, not to limit the patient's daily activities. Since their placement is under the skin, the risk of complications is less than other central venous catheters (occlusion, infection, dislocation, thrombosis, extravasation, phlebitis, bleeding, etc.), and no dressing is required (after healing of the wound) (1,6,7). Port catheter is a closed system consisting of a catheter extending into the central vein, a subdermal reservoir connected to the catheter, and a special needle inserted into the reservoir through the dermis (8,9). Port catheters are placed in the upper thoracic region (chest port), usually above the upper pectoral muscle. More rarely, it can also be placed in the upper arm region and femoral region (inguinal port) as alternatives (9,10). Although the cost of port catheters is high, there are significant advantages, such as patients experience less pain and anxiety due to a small number of needle interventions, a lower risk of infection, and do not interfere with the activities of patients due to their complete placement under the skin (bathing, swimming, etc.). It is not disturbing the cosmetic appearance (7,8,11,12). Early complications associated with catheter port are as follows; cardiac arrhythmias, pneumothorax, hemothorax, vascular injury, air embolism and while late-term complications can be listed as follows; functional disorders of the catheter, venous thrombosis, displacement of the catheter or port reservoir, occlusion, infection, and extravasation (2,5,8,11,13-16). Within the scope of this information, the knowledge and experience of nurses about port catheter care seems very important. Nurses who have a vital role in providing health services have critical roles in the care of patients with a port catheter related to safely performing interventions, preventing the development of complications, early detection of complications, and training the patient and their family about port catheter care (8,17,18). It was considered essential to identify nursing practices that could significantly affect the quality of patient care about the port catheter. We assume that the results of this study will also guide the training that will be planned in the field of nursing related to port catheter care.

MATERIAL AND METHOD

This research was planned as a descriptive study to determine the practices of the nurses in port catheter care. The research was conducted between May 2020 - December 2020 in an Education and Research Hospital in Izmir. 889 nurses constituted the population of the study. It is planned to include 208 people in the study when the sample size is calculated according to the confidence level of 90%, where the population size is 889, and the acceptable error rate is 5%. However, the research was completed with 196 nurses who agreed to participate in the study. In the study, 22.4% of the population was reached. Participation criteria in the study were determined as working as a nurse, and the exclusion criteria were determined as not agreeing to participate in the study. The approval of the İzmir Katip Çelebi University Ethics Committee (Decision No:687, Date: 12.05.2020) and the institution were obtained for the research. After being informed about the subject of the research, nurses were invited to participate in the research. Oral and written consent of the nurses who agreed to participate in the study was obtained.

The data collection form was prepared by researchers after a literature review on port catheter care (1,2,5,8,10,17,19,20). The prepared data collection form was submitted for the opinions of ten experts, including five doctors and five academic nurses, and it was edited according to the results of their feedback. The preliminary practice was conducted with 10 clinician nurses to test the intelligibility of the questions. Minor corrections were made in the form by evaluating the feedback. Data about the preliminary practice of the nurses were not included in the study. Nurses were asked to respond to the data collection form by using the face-to-face interview technique. The data collection form consisted of a total of 16 questions aimed at determining the demographic data of the nurses (age, gender, marital status, educational status, service period, and the unit they work in) and determining the nursing initiatives applied for the care of patients with a port catheter.

The computer package program called Statistical Package for Social Sciences (SPSS), version 21.0 for Windows, was used to analyze the obtained data. Identifying statistics as mean±standard deviation (X±SS), median, or percentage (%) was used to analyze the study data. Answers to open-ended questions were written using the scoreboard technique. The researchers read the answers given, and phrases pointing to the same topic were combined and

categorized. By interviewing clinician nurses again, it was evaluated whether the categorized statements matched the answers given.

RESULTS

Participants' sociodemographic characteristics are given in **Table 1**. 90.8% of the nurses involved in the study were female, 65.8% were married, 69.4% had a bachelor's degree, and the average age was 38.08±8.76. 77.04% of nurses (n=151) are concerned about using a port catheter as a venous access route when the patient they care for has a port catheter (**Table 2**). The reasons nurses are concerned about port catheter care are given in Table 2. 28.57% of nurses (n=56) are concerned about developing complications when they intervene through a port catheter.

In response to the question "when they first performed an application after the placement of a port catheter," 15.81% of nurses (n=31) answered that they "immediately after checking the location with radiography upon placement of the port catheter", 8.16% (n=16) stated "1-2 days after placing the port catheter", 2.55% (n=5) stated "one week after placing the port catheter", 2.55% (n=5) stated "after removing the stitches in the area where the port catheter was placed", and 70.91% (n=139) stated as "I have no idea".

In response to the question "Which practices they apply to prevent the development of hematoma when a port catheter is placed recently," 23.46% of nurses (n=46) answered as "frequent monitoring of the area where the port is inserted in terms of hematoma" and 25.51% (n=50) of the nurses answered as "they perform cold application".

The practices of nurses to verify the location of the port catheter were stated as follows: "pulling back blood on the syringe to confirm the location of the port catheter by observing the fluid flow" (17.34%, n=34), "manually palpate the port area" (13.26%, n=26), "Controlling the sound of contact of the port's needle to the reservoir" (1.53%, n=3).

In response to the question "What do nurses pay attention during intervention through port catheter" 20.4% (n=40) of nurses stated that they used a special port catheter needle, and 7.65% (n=15) said they paid attention to the thickness of the Huber needle according to the density of the drug or solution to be infused.

Referring to the practices used by nurses to prevent obstruction of the port catheter, 39.28% of nurses (n=77) stated that they "flush with saline and heparin saline" and "in cases where it is not possible to use the port catheter for a long time they use "flush with heparin saline every 1-2 months".

Table 1. Demographic characteristics of nurses

Features	n	%
Gender		
Woman	178	90.8
Man	18	9.2
Marital Status		
Married	129	65.8
Single	67	34.2
Education status		
High school	12	6.1
Associate Degree	27	13.8
Bachelor's Degree	136	69.4
Master Degree	20	10.2
Doctor's Degree	1	0.5
Working times		
0-1	17	8.7
2-5	12	6.1
6-10	29	14.8
11-20	80	40.8
21 years and over	58	29.6
Unit		
Brain Surgery	7	3.5
Nephrology	11	5.5
Ear-Nose-Throat	17	8.5
Bloodletting	3	1.5
Operating room	28	14.0
Urgent	5	2.5
Obstetrics	7	3.5
Cardiovascular	3	1.5
Nuclear medicine	3	1.5
Radiologist	9	4.5
Urology	2	1.0
Gastroenterology	15	7.5
General Surgery	26	13.0
COVID Units	6	3.0
Oncology	7	3.5
Thoracic surgery	2	1.0
Hematology	8	4.0
Internal	20	10.0
Cardiology	21	10.5
* Average age. 38.08±8.76	Total=196	Total=100

* Average Age

Table 2. Reasons for nurses ' concern over port catheter care

Causes of concern	n	%
Lack of information on Port catheter use	45	22.95
Lack of experience with Port catheter use	35	17.85
Damage to the port catheter reservoir	15	7.65
Risk of developing complications (hematoma, extravasation, embolism, thrombophlebitis, infection, blockage of the catheter)	56	28.57
Total	151	77.04

In response to the question of what their practices were to prevent port catheter infection; 21.93% of nurses (n=43) stated as "dressing with antiseptic solution before application", 37.5% (n=36) of the nurses stated that 'they follow-up the patient in terms of local and systemic signs of infection".

Referring to the practices to prevent the development of extravasation in the port catheter area, 17.34% of nurses (n=34) stated as "they check by withdrawing blood before any application", 18.87% (n=37) stated that "they monitor the area where the port is located in terms of the signs of extravasation", 6.12% (n=12) stated that "they inform patients and their relatives about the symptoms of extravasation. The topics on which nurses train patients on port catheter care are given in **Table 3**.

Table 3. Training topics given by nurses to patients about port catheter care

Topics	n	%
Signs and symptoms of local and systemic infection	21	10.71
Hygiene rules	6	3.06
Flushing the port catheter with heparin saline for 1-2 months	77	39.28
Dressing	43	21.93
Extravasation findings	12	6.12
Protection of the area where the port is located from trauma	23	11.73
Undesirable situations (displacement of the reservoir, fire, etc.) if it is necessary to contact the health care provider immediately	5	2.55

* More than one answer has been given.

DISCUSSION

Central venous catheters are devices that have to be used often in the treatment processes of patients. Especially central venous port catheters, which have a closed system, are suitable for long-term intravenous access in cancer patients compared to other external central venous catheters because these are safer, more comfortable, and less intrusive in terms of appearance and used very often for this purpose (8,11,12). Nurses can meet patients with port catheters in almost every clinic while providing patient care. For this reason, nurses must have sufficient knowledge and experience in port catheter care. Otherwise, although the patient has a port catheter, peripheral intravenous vascular access can be established again, creating a risk of infection with an extra intervention and causing the patient to experience pain and suffering (3). In this study, the practices of nurses on port catheter care were determined. When we consider the results, we observed that a considerable proportion of nurses had no idea about the questions asked about port catheter care and experienced anxiety when caring for a patient with a port catheter. When we consider why nurses are concerned about port catheter care, it is also seen that lack of knowledge and experience occupies a vital place. In studies, it was concluded that nurses' knowledge of port catheter care was low (8,17). The results reveal parallelism for the nurses with a lack of knowledge and experience in port catheter care. It is assessed that establishing training programs for nurses that include evidence-based practices related to port catheter care will positively impact both the level of knowledge and concern of nurses about this issue (21).

Referring to their initial application after the port catheter placement, the nurses stated that they intervened through the port catheter after different periods, but mainly "immediately after checking to utilize the radiography" and "after the day after the stitches were removed". After checking the location of the catheter when the port catheter is inserted, intervention can be made through the catheter (22). Different applications about the initial application time can reveal results ranging from establishing a second peripheral vascular access point although a port catheter exists to late initiation of treatment. For this reason, adding time information about the first use of the catheter will help eliminate the dilemmas in this regard when developing protocols for the use of a port catheter.

The following practices of the nurses seem consistent with the literature; palpate the port reservoir to confirm the location of the catheter before performing any intervention, pay attention to the sound of contact of the needle to the reservoir when inserting the needle, and check the fluid flow by withdrawing the blood after inserting the needle (8,22). These applications can prevent the development of extravasation. Extravasation begins with symptoms such as pain, erythema, burning, itching, edema, and continues with induration, desquamation, and bulla formation and may progress to the formation of necrotic plaques (23). In this study, nurses stated that they checked the location of the catheter by withdrawing blood to the injector before any intervention, monitored the area where the port was located for signs of extravasation and informed the patient and his relatives about the signs of extravasation to prevent the extravasation development, albeit at a low level. In addition to these practices, it is estimated that good fixing of the port catheter needle, the use of transparent cover in the port catheter area, and the creation of protocols to prevent extravasation by increasing nurses' awareness on this issue can reduce the incidence of extravasation (23,24).

The nurses stated that they used a special port catheter needle to perform the application from the port catheter and paid attention to the thickness of the Huber needle according to the density of the drug or solution to be infused. Huber needles used in Port catheter access are specially designed. When Huber needles are placed in the port septum, they prevent fragments from the tissue. In this way, it makes the texture durable up to about 2000 insertions. Otherwise, the patient's tissues are damaged by the septum of the port catheter, and the catheter life is shortened (24,25). Considering the importance of port catheters in the treatment of the patients and their cost, the attentive behavior of

nurses in this regard, will be positively reflected in the patient's output. Another critical issue regarding the use of Huber needles is the stabilization of the needle. It is also stated that recommended usage of the transparent cover to observe any symptoms of hematomas, infection, and extravasation are not sufficient and additional use of sterile strips or sterile tapes may contribute to the safety of Huber needles by preventing irritation, needle displacement, and infection (19).

In order to prevent the development of hematomas when the port catheter was first inserted, nurses stated that they performed cold application and monitored the area for the development of hematomas. Careful monitoring of the interference zone will allow you to notice complications early and start treatment immediately. The cold application will reduce the development of pain, edema, and hematoma in the area by reducing blood flow to the area where the port catheter is placed and causing vasoconstriction (24,26).

In this study, nurses stated that they flush with saline and heparin saline not to block the port catheter. In cases where the port catheter will not be used for a long time, they stated that they flush with heparin saline. These practices are consistent with the literature, although the rate of expression by nurses is not at the desired level. In order to prevent drug and blood accumulation in the catheter lumen, it is recommended to flush with 10 to 20 ml of saline before and after each application and to use heparin saline prepared with 10 to 100 units of heparin per milliliter in lock washing using positive pressure to prevent reflux back to the catheter after the patient's treatment is over (2,19). Here, another important issue is monitoring patients for complications such as bleeding caused by heparin, the risk, and the presence of heparin-related thrombocytopenia. Monitoring tissue plasminogen activator (tPA) value and taking measures such as extending flush intervals when this value runs up may benefit in the management of complications (19).

Port catheter-related infection rates are reported to be 0.018 to 0.35 per 1000 catheter days (10). Referring to port catheter-related infections, external-lumen infections are due to the lack of proper antiseptic application on the skin before the placement of Huber needles, and internal-lumen infections are due to infusion of the diluted solution into the catheter and thereby migration of organisms from the center of the catheter to the catheter lumen. Infection, which can also occur for reasons such as contamination caused by another source, provide a suitable environment for fungal or bacterial colonization at the fibrin sheath caused by the body's normal response to the catheter, is the most common complication associated with the port catheter (2,10,22). Port catheter infection causes the patient to undergo diagnostic procedures, undergo many antibiotic treatments, and even remove the port and install a new one, prolonging the patient's hospital stay, deteriorating comfort, and increasing health care costs (4,11,14,24). For all these reasons, the practices applied by nurses to prevent port catheter infection are of great importance. In this study, nurses stated that they dress the area with antiseptic solution before application to prevent port catheter infection and followed the patient in signs of local and systemic infection. In addition to these applications, some others are indicated in the literature as follows; to ensure hand hygiene infection prevention, not applying any dressing until the wound recovers after initial insertion of the port catheter, complying with port aseptic catheter techniques during the application, cleaning the skin before every intervention with 2% alcoholic chlorhexidine solution (for patients with allergy to alcoholic chlorhexidine, use povidone-iodine), providing a safe way of stabilization of the Huber needle, replacement of Huber needle every 7 days, and changing this infusion sets in every 24 hours (2,10,19). All these applications must exist in nursing practices to prevent catheter-related infections.

CONCLUSION

According to the results of this study, which evaluated nursing practices related to Port catheter care, the practices performed by nurses are compatible with the literature but limited. It is believed that conducting in-depth training programs, including evidence-based practices related to this issue, will improve the quality of patient care offered by nurses and positively contribute to patient outcomes.

Limitations of the study: The single-center execution of this study can be considered the research's limitations.

ETHICAL DECLARATIONS

Ethics Committee Approval: The approval of the İzmir Katip Çelebi University Ethics Committee (Decision No:687, Date: 12.05.2020)

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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